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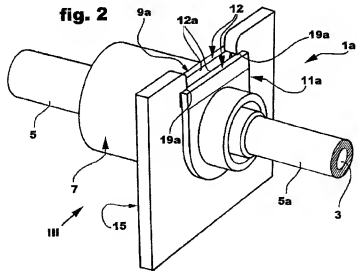
(54) **A unit for restraining an elongate element, particularly the sheath of a flexible cable**

(57) A unit for restraining an elongate element, particularly the sheath of a flexible cable, comprises an abutment body (7) coaxial with the elongate element and having a pair of opposed shoulder surfaces (9, 11) which define, on opposite sides, an engagement portion (13) of the abutment body (7), the unit also comprising a support bracket (15) having a main seat (17) for housing the engagement portion (13) of the abutment body (7). The axial distance between the shoulder surfaces (9, 11) is fixed and corresponds substantially to the thickness of the bracket (15), at least in the vicinity of its main seat (17), and the bracket (15) has, in the vicinity of the main seat (17), at least one auxiliary seat (19a; 19b) for engagement, as a result of a movement of the abutment body (7) relative to the bracket (15) in a plane substantially parallel to the bracket (15), by snap locking means (12a; 12b) connected to the abutment body (7). The snap locking means (12a; 12b) project axially into the space between the two shoulder surfaces (9, 11).

fig. 2



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Description

[0001] The present invention relates to a unit for restraining an elongate element, particularly the sheath of a flexible cable, the unit comprising an abutment body coaxial with the elongate element and having a pair of opposed shoulder surfaces which extend transverse the general axis of the elongate element and which define, on opposite sides, an engagement portion of the abutment body, the unit also comprising a support bracket having a main seat for housing the engagement portion of the abutment body.

[0002] In known restraining units of the type indicated above, one of the shoulder surfaces coincides with an end surface of a main portion of the abutment body and the other shoulder surface, opposite the first, is constituted by an end surface of a tightening bush mounted for sliding coaxially relative to the main portion of the abutment body. A thrust spring is associated with the main portion and with the bush so as to urge the latter towards the above-mentioned end surface of the abutment body. In this manner, when the abutment body is disposed in a seat, normally a U-shaped seat, formed in a support bracket, the mutually facing end surfaces of its main portion and of the bush thus come into abutment with the opposed faces of the bracket under the effect of the resilient force of the thrust spring, so that the abutment body is fixed in the seat in the bracket.

[0003] However, the fact that the abutment body comprises two sliding portions and a thrust spring makes it fairly complex to produce and to assemble and therefore leads to an increase in its production costs.

[0004] To solve this problem, the subject of the invention is a restraining unit of the type indicated above, characterized in that the axial distance between the shoulder surfaces of the abutment body is fixed and corresponds substantially to the thickness of the bracket, at least in the vicinity of its main seat, and in that the bracket has, in the vicinity of the main seat, at least one auxiliary seat for engagement, as a result of a movement of the abutment body relative to the bracket in a plane substantially parallel to the bracket, by snap locking means connected to the abutment body, the snap locking means projecting axially into the space between the two shoulder surfaces.

[0005] By virtue of these characteristics, the unit according to the invention has a simple structure which, in particular, enables the abutment body to be formed as a single piece, advantageously reducing production costs. Moreover, the locking means are disposed in a position which is protected from external knocks and enable a reliable locking of the abutment body to the seat in the respective bracket to be achieved without the need for sliding parts of the abutment body.

[0006] Further characteristics and advantages of the invention will become clearer from the following detailed description, provided purely by way of non-limiting example with reference to the appended drawings, in which:

Figure 1 is a schematic, perspective view of a first variant of a restraining unit according to the invention, in the separate condition prior to assembly,

Figure 2 is a view similar to that of Figure 1, showing the unit in the assembled condition,

Figure 3 is a side elevational view of the unit from the side indicated by the arrow III of Figure 2,

Figure 4 is an elevational view of the unit from the top as indicated by the arrow IV of Figure 3,

Figure 5 is a side elevational view sectioned on the line V-V of Figure 4,

Figure 6 is a schematic, perspective view of a second variant of the invention in the separate condition prior to assembly,

Figure 7 is a view similar to that of Figure 6, showing the unit in the assembled condition,

Figure 8 is a side elevational view of the unit from the side indicated by the arrow VIII of Figure 7,

Figure 9 is an elevational view of the unit from the top, as indicated by the arrow IX of Figure 8,

Figure 10 is an elevational view from the top, sectioned on the line X-X of Figure 8, and

Figure 11 is a side elevational view, sectioned on the line XI-XI of Figure 9.

[0007] With reference initially to Figures 1 to 5, a unit for restraining an elongate element, for example, the sheath of a flexible cable, also known as a "push-pull" cable, is generally indicated 1a. In particular, the unit 1a comprises a generally cylindrical abutment body 7 having an axial through-cavity 3 along which a sliding core (not shown in the drawings) of the push-pull cable, is normally housed.

[0008] Two cylindrical tubular portions 5 and 5a of smaller diameter than the body 7 extend at the opposite ends of the body 7 and both are intended for guiding the sliding of the core of the push-pull cable, the portion 5 also being arranged for enabling the sheath (also not shown) of the cable to be fixed, in known manner, for example, by means of a male-and-female screw coupling.

[0009] The body 7 has a pair of flat shoulder surfaces 9 and 11 which face one another so as to be opposed and, advantageously, are formed integrally with the body. The surfaces 9 and 11 are defined, in particular, by the faces of a pair of generally U-shaped plates 9a

and 11a, both extending transversely relative to the body 7 and disposed in positions close to the tubular portion 5a.

[0010] An annular engagement portion 13 of the abutment body 7 defined between the shoulder surfaces 9 and 11 can be engaged in an opening 17 in a bracket 15, for example, connected rigidly to a portion of the body of a motor-vehicle in order to provide a fixed reference for the position of a portion of a push-pull cable.

[0011] In particular, the bracket 15 has a U-shaped opening 17 shaped in a similar manner to the plates 9a and 11a, a pair of notches 19a being formed in mutually facing positions in the sides of the seat 17. The thickness of the bracket 15, at least in the region of the bracket 15 adjacent the edge of the opening 17, corresponds substantially to the axial distance between the surfaces 9 and 11.

[0012] Respective resilient appendages 12 formed on the abutment body 7 at the upper ends (with reference to the drawings) of the plates 9a and 11a, extend transverse the general axis of the body 7, spaced therefrom by a distance corresponding to the distance of the notches 19a from the same axis, when the body 7 is fitted in position in the seat 17, that is, when the engagement portion 13 is in abutment with the base of the U-shaped seat 17.

[0013] Both of the resilient appendages 12 have, in the vicinity of their free ends farthest from the general axis of the body 7, a pair of inclined surfaces 12a which project into the space between the surfaces 9 and 11 so as to define a space narrower than the axial width of the engagement portion 13.

[0014] As a result of the radial insertion of the engagement portion 13 in the seat 17 of the bracket 15 in the direction indicated by the arrow A in Figure 1, the appendages 12 are deformed slightly away from one another so as to allow the edge of the opening 17 to pass between them. When the engagement portion 13 abuts the base of the seat 17, the opposite ends of the resilient appendages 12 are engaged in the notches 19a so that they can return to the undeformed condition in which the distance between the inclined surfaces 12a is less than the width of the portion 13 so that the surfaces abut respective upper surfaces of the notches 19a, preventing radial removal of the body 7 from the bracket 15.

[0015] In particular, when the restraining unit 1a is in the assembled condition, the shoulder surfaces 9 and 11 prevent axial movement of the body 7 and hence of the sheath of the push-pull cable fixed thereto and, by virtue of the engagement of the appendages 12 in the notches 19a, the body 7 is also fixed relative to the bracket 15 both radially and with regard to rotation.

[0016] Figures 6 to 10, in which elements identical or similar to those of Figures 1 to 5 have been indicated by the same reference numerals, show another variant of the restraining unit according to the invention, indicated 1b.

[0017] In this variant, a first shoulder surface 9 of the abutment body is formed by a substantially flat end surface of the body 7 extending transverse the general axis of the body 7, whereas the opposite surface 11 is defined by the faces facing towards the surface 9, of a plurality of substantially rigid, shaped tabs, for example, two tabs 11a advantageously formed integrally with the body 7 on the side closest to the tubular portion 5a. The annular engagement portion 13 extends between the shoulder surfaces 9 and 11 thus defined.

[0018] The opening 17 in the bracket 15 is constituted by a circular hole from which a plurality of radial recesses 19b corresponding in number and shape to the tabs 11a, extend, so that the body 7 can be inserted axially in the opening 17 by placing the tabs 11a in the radial recesses 19b. In this variant also, the thickness of the bracket 15, at least in the region of the opening 17 and of the recesses 19b, is substantially equal to the axial width of the engagement portion 13.

[0019] At least one resilient tongue 12b, the shape of which corresponds substantially to that of the radial recesses 19b, is formed, preferably integrally with the body 7, in the vicinity of the shoulder surface 9 and in a position spaced from the tabs 11. The tongue 12b extends in a configuration such as to be substantially inclined to the general axis of the body 7 so as to project into the space between the shoulder surfaces 9 and 11.

[0020] If there are two diametrally opposed tabs 11a, as shown in the drawings, there are also two diametrally opposed tongues 12b disposed at approximately 90° to the tabs 11a. The abutment body 7 can thus be inserted axially in the opening 17, as indicated by the arrow B of Figure 6, by placing the tabs 11a so that they coincide with the recesses 19a of the bracket 15. The exertion of a slight pressure on the body 7, again in the direction of the arrow B, overcomes the resilient force of the tongues 12b, enabling the shoulder surface 9 to be brought into frontal abutment with the corresponding face of the bracket 15. In this configuration, the abutment body 7 can be rotated through 90°, as indicated by the arrow C of Figure 7, so as to place the resilient tongues 12b in the radial recesses 19b where they adopt the undeformed condition again, snap-engaging the recesses.

[0021] When the unit 1b is in the assembled condition, the shoulder surfaces 9 and 11 lock the body 7 axially relative to the bracket 15, whilst the engagement of the resilient tongues 12b in the radial recesses 19b restrains the body 7 with regard to rotation relative to the bracket 15.

Claims

1. A unit for restraining an elongate element, particularly the sheath of a flexible cable, the unit comprising an abutment body (7) coaxial with the elongate element and having a pair of opposed shoulder surfaces (9, 11) which extend transverse the general axis of the elongate element and which define, on

opposite sides, an engagement portion (13) of the abutment body (7), the unit also comprising a support bracket (15) having a main seat (17) for housing the engagement portion (13) of the abutment body (7),
characterized in that the axial distance between the shoulder surfaces (9, 11) of the abutment body (7) is fixed and corresponds substantially to the thickness of the bracket (15), at least in the vicinity of its main seat (17), and in that the bracket (15) has, in the vicinity of the main seat (17), at least one auxiliary seat (19a; 19b) for engagement, as a result of a movement of the abutment body (7) relative to the bracket (15) in a plane substantially parallel to the bracket (15), by snap locking means (12a; 12b) connected to the abutment body (7), the snap locking means (12a; 12b) projecting axially into the space between the two shoulder surfaces (9, 11).

2. A unit according to Claim 1, characterized in that the snap locking means comprise at least one resilient member (12a; 12b).

3. A unit according to Claim 2, characterized in that the main seat (17) is U-shaped, and in that the at least one auxiliary seat comprises a notch (19a) in a side of the U-shaped seat (17), at least one of the shoulder surfaces (9, 11) of the abutment body (7) having a resilient appendage (12) spaced from the axis of the elongate body and having an inclined portion (12a) projecting towards the other abutment surface (11) so that, as a result of the radial insertion of the engagement portion (13) of the abutment body (7) in the main seat (17) of the bracket (15), the resilient appendage (12) snap engages the respective notch (19a), preventing radial removal of the abutment body (7) from the bracket (15).

4. A unit according to Claim 3, characterized in that the at least one auxiliary seat comprises a pair of notches (19a), formed in mutually facing positions, each on one of the sides of the main U-shaped seat (17), each of the notches (19a) being intended to be engaged by a respective end of the inclined portion (12a) of the resilient appendage (12).

5. A unit according to Claim 4, characterized in that each of the shoulder surfaces (9, 11) of the abutment body (7) has a resilient appendage (12) spaced from the axis of the elongate body and having an inclined portion (12a) which projects towards the other shoulder surface (9, 11), the resilient appendages (12) being parallel to one another and being disposed at the same distance from the general axis of the elongate body so that, as a result of the insertion of the abutment body (7) in the main seat (17) of the bracket (15), the ends of the pair of resilient appendages (12) engage the pair of notches (19a).

6. A unit according to Claim 2, characterized in that one (11) of the shoulder surfaces (9, 11) of the abutment body (7) is defined by means of a plurality of rigid, shaped tabs (11a) which extend radially from the general axis of the elongate element, and in that the main seat of the bracket (15) is a circular hole (17) having a plurality of radial recesses (19b) corresponding to the shaped tabs (11a), at least one resilient tongue (12b), also of a shape corresponding to that of one of the radial recesses (19b), being associated with the other shoulder surface (9) so that, after the abutment body (7) has been placed in the main seat (17) with the rigid tabs (11a) in the respective radial recesses (19b), the at least one resilient tongue (12b) is snap-engaged in a respective radial recess (19b) as a result of a rotation of the abutment body (7), preventing further rotation of the abutment body (7) relative to the bracket (15).

7. A unit according to Claim 6, characterized in that a pair of resilient tongues (12b) extend from the other shoulder surface (9) in diametrally opposed positions, preferably at 90° to the rigid tabs (11a), so that the snap-engagement of the resilient tongues (12b) in the respective radial recesses (19b) can be achieved as a result of a rotation of the abutment body (7) through 90° relative to the bracket (15).

fig. 1

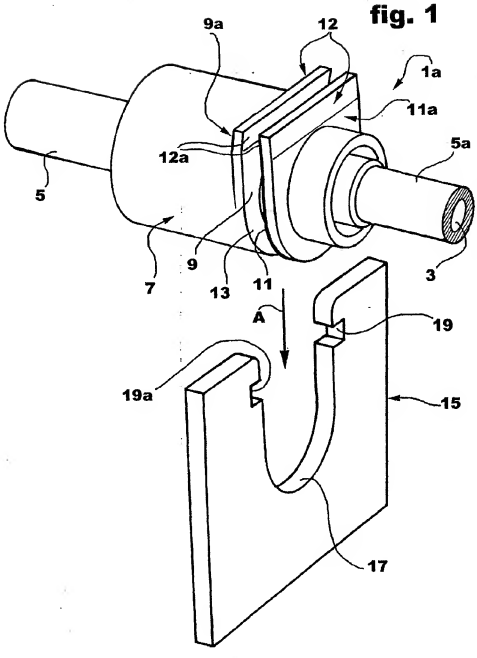


fig. 2

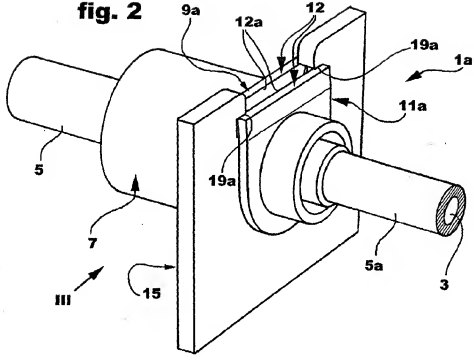


fig. 3

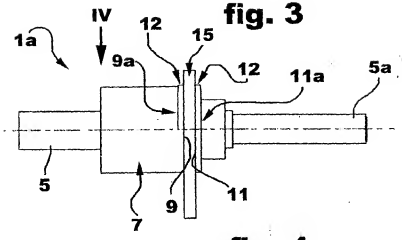


fig. 4

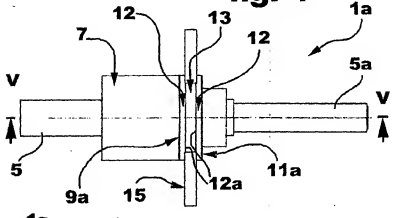
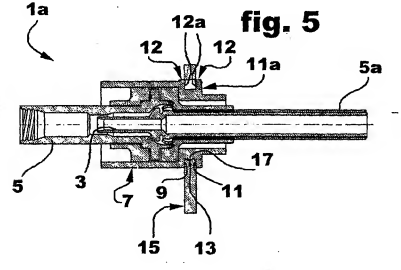


fig. 5



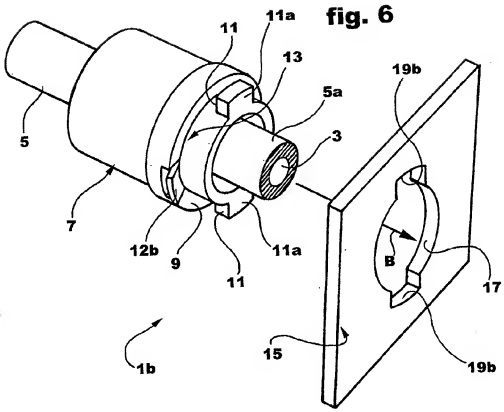


fig. 6

fig. 7

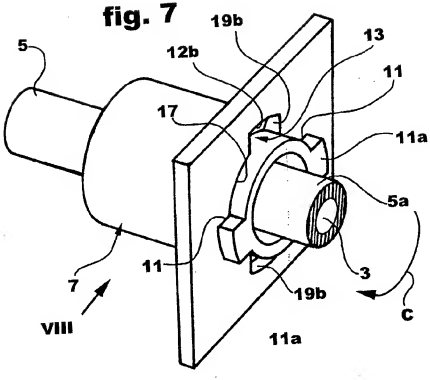


fig. 8

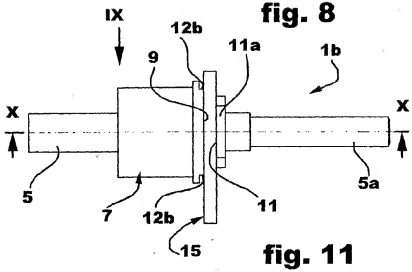


fig. 11

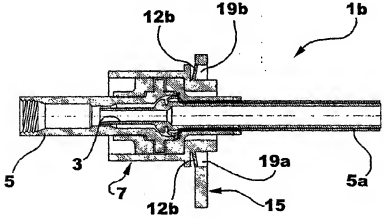


fig. 9

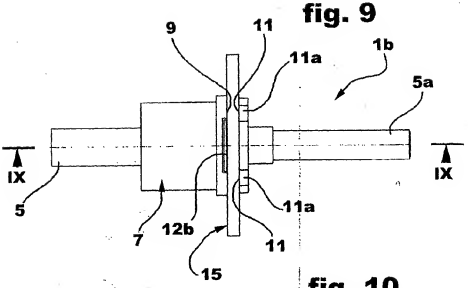
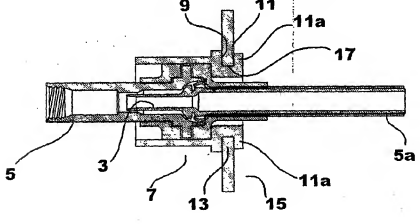


fig. 10



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 8503

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 February 2001	Orthlieb, C

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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 8503

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

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